Programme Information		
Programme Title	Programme Code	HECoS Code
MSc in Medical Ultrasound (Echocardiography) **MSc in Medical Ultrasound (Vascular) full time** **MSc in Medical Ultrasound (Vascular) part time**	For Registry Use Only	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc in Medical Ultrasound (Echo)	1 year	Full time only, as students taking this specialism do not undertake other parallel activities or employment. This also allows for homogeneous teaching for all students	Annually October	90	180
MSc in Medical Ultrasound (Vascular)	1 year full time 2 year part time	Full / part time	Annually October	90	180

Ownership			
Awarding Institution	Imperial College London	Faculty	Medicine
Teaching Institution	Imperial College London	Department	NHLI
Associateship	N/A	Main Location(s) of Study	Hammersmith
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		N/A	
FHEQ Level		Level 7	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details	
Programme Lead	Prof P Nihoyannopoulos
Student cohorts covered by specification	2019-2020 entry
Date of introduction of programme	October 2000
Date of programme specification/revision	2019

Programme Overview

MSc in Medical Ultrasound provides clinicians and medical scientists with intensive training in both the theoretical basis of medical ultrasound and practical scanning and diagnostic skills. The programme is both academic and vocational in nature, and it is the only MSc of this type to offer a substantial clinical attachment as part of the programme, running alongside the taught modules. As it is an academic degree, it does not provide automatic qualification to practise as a sonographer, and national examinations are normally required to achieve this. Nevertheless, the programme follows the core British Society of Echocardiography or Society for Vascular Technology syllabus and prepares any future candidate for the successful completion of the national examinations. Specifically, it allows you to create a substantial portfolio of scans collected from a range of patients, which will both provide you with relevant skills and knowledge, and which can form the core of the expanded portfolio needed for professional registration. Whilst the majority of students are aiming for professional registration, the programme design will equip you to pursue an academic pathway, or even an unrelated career requiring postgraduate level transferrable skills. Many of these additional skills are delivered through the research project which forms a major part of the programme. You will be expected to plan and carry out a substantial piece of independent research under the guidance of your supervisor.

The vascular and echocardiography specialities run independently in their respective departments. You will have exposure to the real-life workings of a department and extensive contact with patients. For all full-time students, hands-on experience is acquired through placements within Imperial College Healthcare NHS Trust. In addition, students who are already working in a suitable National Health Service department and who wish to study the vascular ultrasound stream part- time, may be able to complete the practical elements of the programme in their workplace, under close supervision from their Imperial programme lead.

Teaching and learning for the two specialities diverges at the level of the Ultrasound Specialism, and the Individual Project. The experience of students undertaking clinical placements (Clinical Studies module) will also be discipline-specific. The two Ultrasound Specialism modules are structured differently because of the nature of the disciplines. Nonetheless there is a core Medical Ultrasound discipline, unified in this MSc programme by the Physics of Ultrasound module, the learning outcomes of the programme, the large practical component mandated by the nature of the profession, and the coordination of both streams by a single Programme Lead.

Learning Outcomes

On successful completion of the programme, you will be able to:

1. Apply physical principles to the interpretation of clinical data in unfamiliar contexts
2. Perform and interpret a comprehensive ultrasound analysis as appropriate to specialisation selected
3. Make clinical decisions on the basis of physical evidence
4. Decide clinical priorities and manage caseload effectively
5. Identify and critique published research relevant to the field of study

6. Abstract data from original and published reports
7. Formulate a research hypothesis and design and execute a strategy to test it
8. Select appropriate statistical tests and perform and interpret statistical analyses
9. Implement research and communicate findings verbally and in writing
10. Work independently and as part of a team
11. Reflect on and refine own practice
12. Keep comprehensive and accurate records to serve as the basis for decision making and audit.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements	
Academic Requirement	2:1 UK Bachelor's Degree with Honours in Medicine or a Biological, Engineering or Physical Science subject (or a comparable qualification recognised by the College). GSCE level 5 or above in mathematics and physics, or equivalent ability For further information on entry requirements, please go to https://www.imperial.ac.uk/study/pg/apply/requirements/pgacademic/
Non-academic Requirements	3 years relevant work experience is desirable
English Language Requirement	Standard requirement Please check for other Accepted English Qualifications
Admissions Test/Interview	All candidates are interviewed either in person or via Skype.

The programme's competency standards documents can be found at: https://www.imperial.ac.uk/study/pg/medicine/medical-ultrasound/

Learning & Teaching Strategy

The philosophy of the programme team is that all students need a solid grounding in the underlying physics of medical ultrasound methods, so that you will be able to relate the clinical scan data to the physical basis of the signals. For this reason, the programme begins with the physics module which is taught through a combination of problem solving workshops, demonstrations and practical scanning exercises in which you will learn to operate the controls of the relevant equipment.

In parallel with this, and continuing throughout the year, you will commence your clinical studies module in your chosen specialty. This will involve small group teaching, lectures and the use of case based studies in order to provide you with a sound understanding of the physiology and pathology of the clinical conditions. You will also start learning the practical skills of live scanning in authentic clinical settings under close supervision and will generate a logbook of scans which will demonstrate your progress and which will be summatively assessed. You will also benefit from observing and reflecting on sessions conducted by skilled practitioners

In term two, you will additional undertake an additional module in your specialism in which you will expand and extend your understanding of the relevant clinical conditions through small group teaching based on clinical cases with expert visiting physicians, structured peer assisted learning sessions and directed study on your specialism including relevant calculations.

Also beginning towards the end of term one (if full-time) and continuing throughout the programme, you will commence your project, with a block of teaching on research methods which will provide you with the knowledge and skills necessary to design a piece of research to address a novel question, execute it, analyse the data and communicate it in writing and verbally. The research design element of the module will consist of a blend pf online and face to face teaching in relevant statistics and the principles of quantitative study design. In contrast, you will need a high degree of self-direction to drive your own unique project forward, whilst being supported through regular one to one supervision meetings with your project supervisor.

Throughout the year, formative assessments will allow you to check on your own progress and take control of your learning.

Assessment Strategy

Assessment Methods

A variety of assessments are used throughout the year to ensure that you have both the knowledge and the skills needed to achieve the overarching learning outcomes of the programme. Typically you have will have the opportunity to practise each assessment (for example, through a mock exam) before you are required to take the summative assessment. The bulk of the assessment is in the form of coursework and practical activities, reflecting the practical nature of the discipline.

There is a written exam in the specialism module which has been carefully designed to mimic the examinations used by the relevant professional bodies, in order to help you prepare for an application for registration, after you have graduated.

Likewise, live practical examination of your scanning and reporting skills in a clinical setting, and an assessment of your portfolio of ~ 100 scanned cases will support a future application for professional registration.

On the more academic side of the programme, the physics module is assessed through coursework, and your research project proposal will be assessed by a range of authentic written assignments, which are planned to ensure you have the academic skills needed to successfully design, complete, report and defend, an original piece of research. These start with a review of the relevant literature, a project proposal and ethics application and culminate with your submission of a written dissertation on your research project and a presentation on it, at which you will have the opportunity to answer questions from members of staff and examiners.

Hence, on successful completion of the assessments, you will be equipped both to continue working towards professional registration as a sonographer (the most common destination for most of our graduates), to move into a more academic career, or to shift to a completely unrelated career which demands postgraduate attributes requiring similar transferable skills.

Learning Outcome	**Assessed in**
Application of physical principles to the interpretation of clinical data in unfamiliar contexts	Clinical examination Logbook Physics problem sets Ultrasound specialism assessments
Perform and interpret a comprehensive ultrasound analysis as appropriate to specialisation selected	Clinical examination Logbook Observed clinical sessions
Make clinical decisions on the basis of physical evidence	Clinical examination
Decide clinical priorities and manage caseload effectively	Observed clinical sessions Logbook Clinical Examination
Identify and critique published research relevant to the field of study	Project
Abstract data from original and published reports	Ultrasound specialism assessments Project
Formulate a research hypothesis and design and execute a strategy to test it	Project
Select appropriate statistical tests and perform and interpret statistical analyses	Experimental design module Project
Implement research and communicate findings verbally and in writing	Project report Project presentation
Work independently and as part of a team	Observed practice in clinical skills module Project
Reflect on and refine own practice	Observation of clinical practice

	Observed clinical sessions
Keep comprehensive and accurate records to serve as the basis for decision making and audit.	Logbook

Academic Feedback Policy
The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/
Re-sit Policy
The College's Policy on Re-sits is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/
Mitigating Circumstances Policy
The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Additional Programme Costs		
This section should outline any additional costs relevant to this programme which are not included in students' tuition fees.		
Description	Mandatory/Optional	Approximate cost
N/A	N/A	N/A

Programme Structure (Echocardiography only)[1]					
Year 1					
Code	Module Title	Core/Elective	Group	Term	Credits
	Physics of Ultrasound	Core		1	15
	Ultrasound Specialism: Echocardiography	Core		2	15
	Clinical Studies: Echocardiography	Core		1-3	30
	Experimental Design and Individual Project	Core		1-3	30

[1] **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

				Credit Total	90
Programme Structure (Vascular ultrasound only)					
Year 1 (full time)					
Code	Module Title	Core/Elective	Group	Term	Credits
	Physics of Ultrasound	Core		1	15
	Ultrasound Specialism: Vascular Ultrasound	Core		2	15
	Clinical Studies: Vascular Ultrasound	Core		1-3	30
	Experimental Design and Individual Project	Core		1-3	30
				Credit Total	90
Year 1 (part time)					
Code	Module Title	Core/Elective	Group	Term	Credits
	Physics of Ultrasound	Core		1	15
	Ultrasound Specialism: Vascular Ultrasound	Core		2	15
	Clinical Studies 1: Arterial Ultrasound	Core		1-3	15
				Credit Total	45
Year 2 (part time)					
Code	Module Title	Core/Elective	Group	Term	Credits
	Clinical Studies 2: Venous Ultrasound	Core		1-3	15
	Experimental Design and Individual Project	Core		1-3	30
				Credit Total	45

Programme Regulations

Award and Classification for Postgraduate Students

Award of MSc

To qualify for the award of MSc, a student must have:

1. accumulated credit to the value of no fewer than 90 credits at level 7 or above of which no more than 15 credits may be from credit level 6;
2. and no more than 15 credits as a Compensated Pass;
3. met any specific requirements for an award as outlined in the approved programme specification for that award.

Classification of Postgraduate Taught Awards

The College sets the class of Degree that may be awarded as follows:

1. Distinction: The student has achieved an overall weighted average of 70.00% or above across the programme.
2. Merit: The student has achieved an overall weighted average of above 60.00% but less than 70.00%.
3. Pass: The student has achieved an overall weighted average of 50.00% but less than 60.00%.

a. For a Masters, students must normally achieve a distinction (70.00%) mark in the dissertation or designated final major project (as designated in the programme specification) in order to be awarded a distinction.
b. For a Masters, students must normally achieve a minimum of a merit (60.00%) mark in the dissertation or designated final major project (as designated in the programme specification) in order to be awarded a merit
c. Modules taken at level 6 as part of the programme specification for a named postgraduate award will contribute to the determination of pass, merit or distinction for any taught postgraduate award and are included in the calculation of the overall weighted average.

Please find the full Academic Regulations at https://www.imperial.ac.uk/about/governance/academic-governance/regulations/
Please follow the prompts to find the set of regulations relevant to your programme of study.

Programme Specific Regulations

In addition to the College Regulations on degree classification in the section above, the Programme has these additional specific regulations.

In order to be awarded a distinction for a Masters, students must achieve an overall weighted average distinction (70.00%) mark and also a distinction mark in the following three modules:

- Experimental Design and Individual Project
- Physics of Ultrasound
- Clinical Studies (Echocardiography or Vascular Ultrasound depending on the MSc).

In order to be awarded a merit for a Masters, students must achieve an overall weighted merit (60.00%) mark and also a merit mark in the following three modules:

- Experimental Design and Individual Project
- Physics of Ultrasound
- Clinical Studies (Echocardiography or Vascular Ultrasound depending on the MSc).

Supporting Information
The Programme Handbook is available at: https://www.imperial.ac.uk/study/pg/medicine/medical-ultrasound/
The Module Handbook is available at: https://www.imperial.ac.uk/study/pg/medicine/medical-ultrasound/
The College's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/pg/apply/requirements
The College's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
The College's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine". www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/
Imperial College London is regulated by the Office for Students (OfS) www.officeforstudents.org.uk/advice-and-guidance/the-register/
This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.

Modifications			
Description	**Approved**	**Date**	**Paper Reference**
N/A	N/A	N/A	N/A